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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,066	09/16/2003	Jongill Hong	0941.68363	3251
24978	7590	07/08/2004	EXAMINER BERNATZ, KEVIN M	
GREER, BURNS & CRAIN 300 S WACKER DR 25TH FLOOR CHICAGO, IL 60606			ART UNIT 1773	PAPER NUMBER

DATE MAILED: 07/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/664,066	HONG ET AL.	
	Examiner	Art Unit	
	Kevin M Bernatz	1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>9/16/03;2/17/04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Amendment

1. Preliminary amendments to the specification and claims 3 – 9, and addition of new claims 11 - 13, filed on September 16, 2003, have been entered in the above-identified application.

Examiner's Comments

2. Regarding the limitation(s) "made of a metal which improves GMR performance" in claims 1 and 10, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the Examiner notes that the only materials disclosed as meeting the claimed limitation are the elements listed on page 6, lines 14 – 18 and in claim 3, and alloys thereof.

3. Regarding the limitation(s) "effective magnetic layer thickness, excluding a thickness of a magnetically dead layer" in claim 4, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re*

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Donaldson Co., Inc., 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the Examiner has interpreted this to simply be the thickness of the individual layer since applicants' as-filed disclosure provides no guidance as to what is intended by the language "effective magnetic layer thickness, excluding a thickness of a magnetically dead layer".

Specification

4. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter in claim 4. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the specification should be amended to include the language "wherein the magnetic layer has an effective magnetic layer thickness, excluding a thickness of a magnetically dead layer", which is presently not recited in the as-filed specification.

Claim Objections

5. Claim 3 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The Examiner notes that the metal layer must comprise the elements and alloys thereof listed in claim 3 since these are the only elements applicants' have disclosed are capable of meeting the

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limitation "made of a metal which improves GMR performance" (see Paragraph 2, above).

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claim 4 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a magnetic layer having a thickness of less than approximately 40 Å, does not reasonably provide enablement for a magnetic layer having an effective magnetic layer thickness, excluding a magnetically dead layer, of less than approximately 40 Å. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. This rejection can be overcome by inserting the language "the magnetic layer has an effective magnetic layer thickness, excluding a thickness of a magnetically dead layer" into the specification.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1 – 5, 9 and 10 are rejected under 35 U.S.C. 102(a) and/or (e) as being anticipated by Gill (U.S. Patent No. 6,181,534 B1).

Regarding claims 1, 3 and 10, Gill discloses a magnetic storage apparatus for reading information from a magnetic recording medium (*Figures 1 – 7*), comprising a magnetoresistive spin-valve sensor (MR sensor) which reads information from the magnetic recording medium (*col. 1, lines 5 – 17*), said MR sensor comprising a magnetic layer (*Figure 9, layer 316*), a first specular layer made of a metal oxide (*layer 322*), a second specular layer (i.e. applicants' "back layer") made of a material meeting applicants' claimed limitations (*layer 318*), interposed between the magnetic layer and the specular layer (*Figure 9*), and a metal layer disposed adjacent to the specular layer, opposite to the back layer, and made of a metal which improves GMR performance of the MR sensor meeting applicants' claimed Markush limitations in claim 3 (*col. 8, line 51 bridging col. 9, line 13 – Ta cap*).

Regarding claim 2, Gill discloses specular layers meeting applicants' claimed Markush limitations (*Figure 9*).

Regarding claim 4, instead of relying upon layer 316 as the claimed "magnetic layer", the Examiner notes that layer 312 can be the claimed "magnetic layer" while continuing to meet the rest of the claimed limitations. With the above "magnetic layer" Gill discloses magnetic layers having a thickness meeting applicants' claimed limitations (*layer 312 – 24 Å*). See also layer 504 in *Figure 13*.

Regarding claim 5, Gill discloses back layers meeting applicants' claimed thickness limitations (*Figure 9 – layer 318*).

Regarding claim 9, Gill discloses a pinned and spacer magnetic layer (*layers 306 and 314*) meeting applicants' claimed structural limitations.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 6 – 8 and 11 – 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill ('534) as applied above.

Gill is relied upon as described above.

Regarding claims 6 – 8 and 11 – 13, Gill fails to disclose using AuCu, AgCu or AuAgCu alloys for the back layer.

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However, Gill teaches that the specular reflector layer SR1 can be formed of Cu, Au or Ag (*col. 8, lines 51 – 65*) and that the disclosed invention clearly encompasses other embodiments and modifications which “occur readily to those of ordinary skill in the art in view of these teachings” (*col. 9, lines 14 – 16*). The Examiner deems that using alloys of the three elements listed as suitable by Gill is just such an embodiment or modification which would have been readily envisioned by one of ordinary skill in the art. The Examiner notes that applicants’ claims are open to the entire range of alloy compositions (“x denotes a fraction of Cu in the alloy greater than 0.0 and less than 1.0”).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant’s invention to modify the device of Gill to use AuCu, AgCu and AuAgCu alloys as the first specular reflector layer SR1 since one of ordinary skill in the art would have readily envisioned such an embodiment given the teachings in Gill that suitable materials for the SR1 layer comprise Au, Ag and Cu.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Paul Thibodeau can be reached on (571) 272-1516. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Kevin M. Bernatz', is positioned above the printed name.

Kevin M. Bernatz, PhD
Primary Examiner

July 7, 2004